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DIVISION OF ENVIRONMENTAL HEALTH DEPARTMENT OF HEALTH

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Director's Report

H.L. Hogge, B.Sc., P.Eng., Director

The responsibilities of this Division remained essentially unchanged during the year. These responsibilities are the administration of provincial programs for the supervision of public waterworks and sewerage systems and swimming pools, air pollution control, water pollution control, plumbing and private sewage disposal installations, refuse disposal systems and specialized public health inspection areas. During 1970 the work load in each area increased quite markedly, largely due to the continued economic expansions in Alberta and to the increased public interest in the subject "Environment".

The Division of Environmental Health is responsible to the Minister of Health through the Deputy Minister. The administrative authority for the control of public health function is the Provincial Board of Health and, subject to the approval of the Lieutenant Governor in Council, may make and issue orders, rules and regulations as provided for in The Public Health Act. The Provincial Board of Health is composed of the Deputy Minister of Health (Chairman), the Director of the Division of Environmental Health (Vice-Chairman), Director of the Provincial Laboratory of Public Health, Director of the Division of Local Health Services and the Director of Veterinary Services Division, Department of Agriculture, as members.

The Division takes an active part in the work of the Alberta Advisory Committee on Pollution Control. This Committee reviews the pollution control programs of the Alberta Government and makes recommendations to the Government through the Minister of Health who is Chairman of the Advisory Committee. This Committee held its annual meeting on November 25th and 26th, 1970 in Edmonton, and was attended by 78 members and 30 non-members who attended as observers. A number of recommendations were made by the fourteen subcommittees and there was active discussion by the members during the meeting. The Division prepared a monthly bulletin entitled "Alberta Pollution Items" as part of its work with the Advisory Committee. At the end of the year this bulletin had a circulation of some 230.

The senior staff of the Division received numerous requests during the year to speak at public meetings. On a number of occasions the presentations were short panel presentations by three or four members and followed by discussion periods. The Division also prepared a booklet entitled "Alberta Pollution Control" to assist in making information available to the public. By the end of the year some 18,000 copies had been distributed, some 7,000 of these were sent to schools throughout the Province.

In the Division there are six separate sections, each with a specialized area of responsibility, that must keep abreast of trends and developments within the Province. The specific work carried out by the various sections of the Division during the calendar year 1970 is summarized by the 'Head' of each section and are attached hereto in the following order:

1. Air Pollution Control
2. Water Pollution Control
3. Municipal Engineering
4. Environmental Health Laboratory
5. Public Health Inspection
6. Plumbing Inspection

Air Pollution Control

S.L. Dobko, B.Sc., P.Eng., Head

The Air Pollution Control Section continued in its activities of assessment and control of air pollution. Work in the Section has continued to expand in quantity in certain areas as it has in previous years. The Section's work, as the purpose for which it is established, in general, was directed at regulating the pollution from new industrial plants, assessing and reducing if necessary the pollution from various industrial operations that had been in existence before 1970 assessing the level of pollution in urban areas as well as in the vicinity of industrial operations throughout the Province and investigating complaints regarding air pollution.

Besides the Head of this Section, the staff consists of four engineers, three senior environmental technicians and five laboratory technicians. In addition to these full time employees, from May to September, four summer students were employed to assist in carrying out source sampling surveys.

The various specific work and duties that have been carried out in 1970 by the Air Pollution Control Section are summarized as follows.

Operation of Mobile Laboratories

Two mobile pollution laboratories were continued to be operated throughout the Province by technicians of this Division. These units are used to investigate and observe general air pollution levels in the vicinity of gas processing plants and in sour gas field areas. These laboratories are used to monitor sulfur dioxide and hydrogen sulfide levels along with a number of meteorological parameters such as wind, temperature, relative humidity, and pressure. Besides operating these mobile units the operators are required to carry out, at each location, a survey of the area for all possible sources of pollution so that all results can be correlated.

During 1970, 34 surveys were carried out by these units at 27 different areas. Unit No. 1646 operated a total of 281 days with 84 days lost due to moving of the unit, mechanical difficulties, trailer maintenance and the annual equipment

overhaul. Unit No. 1585 operated for a total of 358 days with 7 days lost due to moving the unit, mechanical difficulties, trailer maintenance and repair, and the annual equipment overhaul. It should be added that the longer than usual downtime for Unit No. 1646 was due to the addition of new facilities to the trailer.

The Division carried out one special survey during 1970 - the measurement of hydrogen sulfide in the vicinity of the Deer Home in Red Deer. This survey was conducted during the first 135 days of 1970.

Permanent Field Monitors

The Division maintains a network of field stations throughout the Province. These stations are changed on a monthly basis and are analyzed by the Pollution Control Laboratory. The number of stations that constitute the network and the pollutants analyzed are as follows: 178 exposure cylinders for the determination of total sulfation; 174 exposure cylinders for the determination of hydrogen sulfide; 75 stations for the determination of dustfall; 17 of the dustfall stations used also for the determination of sulfates; 17 of the dustfall stations used also for the determination of phosphates; 16 treated paper strips for the determination of fluorides; and 14 of the dustfall stations used also for the determination of calcium.

Pollution Source Surveys

In 1970, 37 source surveys were completed to observe if the plant operations were in compliance with the Air Pollution Regulations and/or within their approval conditions.

The surveys can be broken down into 26 source surveys for sulfur dioxide, 5 source surveys for particulates, 2 source surveys for sulfur dioxide and particulates and 4 source surveys for a variety of pollutants (sulfur dioxide, nitrogen dioxide, fluorides, particulates, etc.).

Plant tours were taken at 37 plants to evaluate existing air pollution control facilities and to make recommendations for proper air pollution control.

Incinerators

The Division issued 90 approvals for new incinerators or amendments in 1970. This is the second consecutive year a decrease in incinerator approvals has been observed and tends to indicate that most of the single chamber units have been replaced and only new installations are being made.

To check if incinerators were in compliance with the 'Incinerator Standards for the Province of Alberta' and that the operations were in compliance with the Air Pollution Control Regulations, 28 inspections were made. The selection of units for these checks were on a spot or complaint basis.

Approvals Issued to Existing Plants and New Industries

31 final approvals and 3 provisional approvals were granted to new or existing plants which made changes to their operations. In addition, 59 temporary approvals were issued for operations of a temporary nature, that is, well flaring, open burning. Most of these temporary approvals expired during the 1970 calendar year. Because the jurisdiction over gas and sulfur plants had been taken over by the Oil and Gas Conservation Board, 18 approvals were cancelled by this Department and taken over by the Oil and Gas Conservation Board.

In order to obtain a better knowledge of the area in the vicinity of new plants, 11 site investigations were carried out by members of the Division.

Effect of SO_2 Upon Vegetation

Samples were again collected in the vicinities of gas plants to study the effect of SO_2 upon vegetation. In total, 171 samples were gathered by members of this Division and the Department of Lands and Forests and all of the analysis was done by the Division's laboratory.

Special Projects

Geoscience Research Associates Ltd. completed their work (sponsored by the Department of Health) in the Meteorological Research Project in Calgary and Edmonton in March. Furthermore Geoscience Research Associates Ltd. was retained to operate the meteorological equipment and collect the data for the Department.

A special project on Diesel Exhaust emissions and exhaust abatement methods was undertaken during the latter part of 1970 in conjunction with the Edmonton Transit System. The project will continue into 1971.

A determination of continuous 24 hour high volume sampler results was carried out for a period of approximately one month in Calgary.

A comparison of total particulate matter was carried out by the Division in Edmonton to determine the accuracy of the dustfall method.

Maintenance and Calibration of Equipment

To prevent major downtime in the operation of the pollution monitoring equipment a routine maintenance and calibration schedule was continued. This work is essentially carried out by the senior environmental technicians. The addition of complex electronic measurement units has made it possible to carry out this work better and quicker than before.

Urban Monitoring

The Division continued to carry out detailed urban monitoring in the cities of Calgary and Edmonton. During 1970, three additional high volume samplers were added to the Calgary network and two to the Edmonton network. The Calgary air monitoring network now consists of 11 total dustfall stations, 11 total sulfation stations, 7 hydrogen sulfide stations, 5 smoke samplers, 4 fluoride stations, 4 high volume samplers, 1 oxidant analyzer and 1 nitrogen dioxide - total oxides of nitrogen analyzer. The Edmonton network now consists of 10 total dustfall stations, 6 smoke samplers, 4 hydrogen sulfide stations, 4 total sulfation stations, 3 high volume samplers, 1 oxidant analyzer, 1 hydrocarbon analyzer and 1 nitrogen dioxide - total oxides of nitrogen instrument.

In addition to the monitoring program in these two cities, the urban network was expanded to the smaller communities of the province and now monitoring is carried out in 9 Alberta centers. The Red Deer network consists of 2 total sulfation stations, 2 hydrogen sulfide stations, 1 dustfall station and 1 high volume sampler; the Lethbridge and Camrose networks consist of 1 station for the measurement of total sulfation, hydrogen sulfide, total dustfall and a high volume sampler; the St. Albert, Grande Prairie, Hinton and Medicine Hat networks consist of a high volume sampler in each community.

Computer Programs

A computer program was written to calculate and plot graphically monthly averages, seasonal averages and yearly averages for dustfall, calcium content, hydrogen sulfide, total sulfation and fluorides for a five year period. This program is to be used on the results obtained from the Division's urban and rural monitoring networks.

The existing program used to prepare the monthly urban results was modified, with the new regulations in mind, and combined with an additional program in order to expedite the dissemination of this information.

Another program was written to handle the expanded exposure cylinde networks for Edmonton and Calgary which will come into effect in the coming year, 1971.

Investigation of Complaints

In 1970, 167 complaints were received by the Division and 115 follow-up investigations were carried out. The majority of the complaints received deal with odor at times of critical meteorological conditions and smoke in the Edmonton area.

Seminars, Courses, Conferences

One staff member of the Air Pollution Control Section attended the Air Pollution Control Association Conference which was held in St. Louis in June 1970. Also one staff member attended a one week course given by the U.S. Department of Health, Education and Welfare. The Section Head also attended 7 additional seminars and meetings dealing with air pollution.

Dissemination of Information

During 1970 the Section received 550 requests for information regarding air pollution with the majority of these coming from school age children. In addition, 50 requests were received in person concerning air pollution and these were handled on a personal basis usually by the engineering staff.

The section personnel were invited to 22 speaking engagements during the year.

Alberta Advisory Committee on Pollution Control

The Air Pollution Control Section continued to partake in the activities of the Alberta Advisory Committee on Pollution Control.

Water Pollution Control

E.E. Kupchanko, M.Sc., P.Eng., Head

The increased attention focused on the environment shifted the concern of the Section during the past year. More complaints were investigated and more direct public contact was achieved through talks and seminars. This, in addition to the responsibility of assessment and control of water pollution in Alberta imposed a considerable burden on the Section.

The staff of the Section was increased by one technician. Four engineers, two engineering technicians, two industrial laboratory technicians, and a temporary technical assistant now represent the complement of the Section.

During 1970, twenty-nine Provinical Board of Health Approvals were issued for the release and control of waste water. Twenty-two approvals for the application of chemicals for aquatic weed control and 15 approvals for the application of chemicals for insect control were also granted during the past year.

Detailed sampling of mercury in industrial effluents and in watercourses was carried out during the year. The trend toward pinpointing specific trace materials such as pesticides, heavy metals, and polychlorobiphenyls was continued throughout the year.

A total of 1,063 samples were taken by this Section during 1970, including 458 river and stream samples, 284 industrial samples, 143 municipal samples, and 122 lake samples. Samples taken during special investigations and complaints totalled 56.

The Alberta Advisory Committee on Pollution Control continued to be active as the various sub-committees met and discussed numerous pertinent water pollution control problems. Due to the interdisciplinary aspects of water pollution control, the Section became involved in several other governmental committees including The Alberta Inter-Departmental Committee on Pesticides, The Conservation and Utilization Committee, and Agri-Chemicals Programs Advisory Committee.

During the year the Provincial Board of Health Regulations Respecting the Disposal of Waste Water and the Control of Water Pollution (Division 39) were adopted. These regulations provided the Provincial Board of Health with control over insecticides applied to water and the mechanism for the establishment of the Water Quality Criteria.

A more detailed summary of the water pollution control program during the calendar year 1970 is presented below.

The Athabasca River Basin

On June 6, 1970 a rupture in a crude oil transmission line near Tar Island resulted in a major oil spill to the Athabasca River. The oil, which was estimated to be 19,000 barrels, moved down the river at a rate of 45 miles per day covering approximately 50% of the water surface. The oil was seen to reach Lake Athabasca by June 13, but by June 20 all visible traces had disappeared from both the river and the lake. No extensive adverse effects were noticed as a result of the oil spill.

On site investigations were carried out by two engineer from the Water Pollution Control Section, who spent a total of ten man days in the area.

For the rest of 1970 the Athabasca River and its tributaries were in good condition. Because of this, only routine bi-weekly sampling was carried out. In total, 40 river samples were taken along with 21 industrial effluent samples. The Athabasca is sampled from above Hinton to below Tar Island north of Fort McMurray. The McLeod River is also sampled on a regular basis at Whitecourt.

Bow River Basin

Five surveys of the Bow River were conducted during the calendar year 1970. Extension to sewage treatment facilities at the Bonnybrook plant in Calgary has reduced the organic loading to the Bow River and bacteriological constituents have diminished. Twenty samples were routinely obtained from the Bow River, seven from the Sheep River; two samples from the Elbow River were obtained as a result of complaint reports. Thirty samples were obtained from industries that discharge waste water effluents to rivers in the Bow River Basin. Thirty 24-hour composite samples were obtained from the 3 sewage treatment plants in Calgary.

The RM-25 robot monitor operated for a total period of 505 hours to obtain continuous monitoring of quality of the Bow River at the Baker Sanitarium and near Steir's Ranch. An automatic recording Dissolved Oxygen monitor (Union Carbide 1101) installed at the water intake line at the City of

Medicine Hat Power Plant did not operate satisfactorily and these units have been withdrawn from service.

North Saskatchewan River

The North Saskatchewan River system was sampled on a regular basis during 1970. Sampling was intensified upstream from Edmonton during the latter part of 1970. Bi-weekly samples were obtained at Brazeau Dam, Drayton Valley, Devon, Edmonton's Fifth Street Bridge, Fort Saskatchewan Bridge, Vinca Bridge, Waskatenau Bridge, Duvernay Bridge, Lindbergh, and Lloydminster Ferry.

Industrial and municipal waste waters associated with this river were sampled regularly during the river surveys to correlate loading from all sources with the overall river water quality. Twelve of fourteen effluent sources were composite sampled over a 24-hour period during each survey.

The total number of samples taken during the year was 345. This consisted of 157 river samples, 40 municipal waste samples and 148 industrial waste samples.

The RM-25 Robot Monitor operated continuously near Vinca Bridge for the first 3½ months of the year. Operation was discontinued in April due to the high silt load of the river. The newly acquired "Honeywell" Monitor was put into service in December 1970 and operated at this site for 240 hours.

Oldman River Basin

Ten surveys of the Oldman River were completed in 1970. Most of these surveys were conducted before, during and immediately after the sugar beet refining period in late fall and early winter when a heavy organic load is imposed on the river.

Regular sampling was extended to Drywood Creek, which is a part of the Oldman River Drainage Basin, and the two gas processing plants that discharge effluents to this watercourse. Five surveys were made on the gas plants during the year.

A total of 119 samples were obtained from the various river sampling sites and effluent sources during 1970. These consisted of 57 river samples, 28 municipal waste samples and 34 industrial samples. Twenty-four hour composite samples were taken from all municipal waste sources.

A program to install a water quality monitor on the Oldman River near Fincastle was initiated. Preliminary studies for land acquisition and power supply for the site should be completed in the new year.

Red Deer River Basin

Surveillance of the Red Deer River and its tributaries was intensified during 1970 due to abnormally low dissolved oxygen levels both above and below the City of Red Deer. Four new sampling sites were established, one nine miles downstream from Red Deer City and three at strategic points upstream, making a total of twelve permanent sites on the river. All twelve sites were sampled every two weeks during the time of ice cover. In addition, an RM-25 Robot Monitor was installed at the Nevis Gas Plant giving a continuous record of dissolved oxygen, pH, temperature and conductivity approximately 52 miles downstream from Red Deer. For correlation with upstream values, arrangements were made with the staff of the Red Deer Water Treatment Plant to take a daily dissolved oxygen reading.

During 1970, seventy-four samples of the Red Deer River were taken and analyzed. As well 21 samples of the municipal sewage and 14 of industrial effluents were analyzed. Several spot samples were also taken on upstream tributaries of the Red Deer River. In addition to the regular analysis parameters, all samples taken from the Red Deer River Basin are being analyzed for total organic carbon. These tests are being run by the Department of Energy, Mines and Resources Water Quality Laboratory in Calgary.

With this greatly increased volume of data, it is hoped that some of the problems associated with the Red Deer River can be solved.

Other Rivers

The Peace River system which includes the Wapiti and Smoky Rivers was sampled twice during the year. The Blindman River, Vermilion River, Blackmud Creek, Whitemud Creek, and several lesser streams were sampled during complaint investigations or during periods when ponded waste waters are allowed to be released.

Lakes

Monitoring of lakes has been extended to include ten lakes in the nearby Edmonton area and the intermediate area north of Red Deer. The extent of monitoring each lake and the associated industrial and municipal waste water discharges has been based on priorities that reflect specific problem areas for each lake. Gull, Isle and Wabamun Lakes are sampled at various locations on a monthly basis. Cooking, Ste. Anne, La Nonne, Pigeon, Sylvan, Buffalo and Miquelon Lakes are surveyed seasonally four times during the year.

The problem of rooted aquatics in Lake Wabamun has generated specific studies of water quality at four different sites, namely, the town pier, Seba Beach, the Provincial Park and the Sundance Plant area. Studies of the thermal effects of the power plant effluent on Lake Wabamun have also been initiated.

Complaints

One hundred and fifty complaints of water pollution were received by this section. This represents a fivefold increase over the complaints received in the previous year.

Information Requests

Greater public interest in water pollution control resulted in 428 requests for information. This is more than double the number of requests received in 1969. Specific information concerning pesticides, mercury, algae, and detergents were also requested.

Conferences and Courses

The following list of conferences and courses were attended by members of the section during 1970:

(1) Fifteenth Annual Waste Water Conference at Niagara Falls, Ontario.

(2) Fifth International Conference on Water Pollution Research at San Francisco, California.

(3) Mosquito Control Conference at Great Falls, Montana.

(4) Training Courses on Plankton Analysis at Cincinnati, Ohio.

Speaking Engagements

A large number of requests were received for members of the section to participate in seminars and speaking engagements. Twenty-eight of these meeting were attended, however, requests from grade schools could not be fulfilled this past year due to other priorities within the section.

Municipal Engineering

R.N. Briggs, M.Sc., P.Eng., Head

During 1970 this section processed 294 submissions for recommendations to the Provincial Board of Health for approval of water and sewerage projects, which includes the approvals of new systems in 6 communities. The total number of communities with water and/or sewerage systems is now 267. In addition, there were 2 public and 20 semi-public swimming pools recommended to the Provincial Board of Health for approval.

A total of 348 water and sewerage inspections in 119 communities and 33 inspections of swimming pool were conducted during the year.

Publication of The Utility Operator was continued in 1970 with four volumes being published. This bulletin, with a circulation of 767, continues to receive very favorable comments from people associated with waterworks, sewage treatment, solid waste disposal and swimming pools.

The fluoridation of public water supplies continues to increase with 37 communities presently utilizing fluoride adjusted water.

A control program for the corrosiveness of treated municipal water supplies was completed in 1970 with 16 towns being surveyed.

Two sanitary surveys to determine the feasbility of installing municipal water and sewerage systems were conducted in Midlandvale and Rosedale.

The increased number of appeals and additional inquiries into pollution matters, and general public interest in our environment resulted in fewer inspections of water and sewerage systems being made throughout the Province. This increased work load is directly reflected in the operation and maintenance of these systems. In addition, Central Mortgage & Housing Corporation requested the services of the province to determine which communities should receive financial assistance under Part VIB of the National Housing Act. Twenty-seven communities were recommended to Central Mortgage & Housing Corporation for financial consideration.

Additional details on the above, along with other activities are provided as follows.

Waterworks and Sewerage Systems

The Public Health Act requires that any new water and/or sewerage system and any extensions or alterations thereto must be approved by the Provincial Board of Health before such work is commenced. In this regard there were 294 submissions recommended to the Provincial Board of Health for their approval. Of these, 64 were for provisional approval and 230 were for final approval which authorizes construction of the project. These final certificates were issued to 87 communities.

The estimated value of the 226 projects covered by the final certificates (4 certificates were superseded) was $36,716,517.00. Table I lists the number of final certificates and their corresponding value since 1953.

A breakdown of the certificates issued is provided in Table II, which in turn explains into which phase of the water and sewerage system the certificates apply to.

During 1970, there were 24 communities, in addition to the 3 new sewerage systems, that received final approval for the extension or provision of sewage treatment facilities.

The six communities which received approval for the installation of a water and/or sewage system are given in Table III along with the respective system that was approved.

As of December 31, 1970, there were 267 communities served with water and/or sewerage systems; 247 communities have water systems, 19 of which do not have sewerage systems; 248 communities have sewage systems, 20 of which do not have waterworks systems.

Additional statistics concerning the water and sewerage systems in the Province are given in Table IV.

During the year there were 348 inspections or consultations conducted with 119 of the various communities with water and/or sewerage. This includes inspection of complaints, follow-up inspections and general inspections.

The decreased number of inspections resulted from a greater work load due to the public awareness of their environment, requests for information, the requirement of Central Mortgage and Housing Corporation for provincial approval and a general increase in work and time required for approval of projects.

TABLE I

REVIEW OF FINAL CERTIFICATES AND ESTIMATED COSTS OF WATER AND SEWAGE WORKS PROJECTS

- 1970 -

YEAR	NUMBER ISSUED	ESTIMATED COST	YEAR	NUMBER ISSUED	ESTIMATED COST
1953	97	$12,465,396	1962	184	$ 9,427,465
1954	109	$16,455,810	1963	146	$ 8,818,845
1955	107	$17,524,020	1964	180	$33,758,486
1956	99	$15,803,965	1965	195	$16,632,629
1957	110	$11,430,812	1966	176	$16,895,259
1958	132	$ 9,795,223	1967	187	$19,974,878
1959	160	$15,733,142	1968	244	$35,652,155
1960	189	$16,820,264	1969	227	$30,090,094
1961	172	$18,876,977	1970	226	$36,716,517

TABLE II

CERTIFICATES ISSUED DURING 1970

PROVISIONAL CERTIFICATES		FINAL CERTIFICATES	
Number Issued	Estimated Cost	Number Issued	Estimated Cost
New Systems			
Water 5		8	
Sewer 1		3	
Total 6	$490,100.00	11	$718,181.00 (6 communities)
Water and Sewer Extensions			
16	$8,462,292.22	119	$18,041,431.45 (65 communities, 11 miscellaneous)
Water Treatment, Supply & Storage			
16	$13,554,845.00	36	$4,005,718.00 (26 communities, 2 miscellaneous)
Sewage Treatment			
20	$5,651,500.00	38	$10,583,086.00 (24 communities, 6 miscellaneous)
Storm Sewers			
6	$478,960.00	22	$3,368,100.26 (16 communities)
Total 64	$28,637,697.22	226	$36,716,516.71

TABLE III

COMMUNITIES WHICH RECEIVED FINAL APPROVAL FOR WATER AND/OR SEWERAGE SYSTEMS

- 1970 -

COMMUNITY	WATER	SEWERAGE
Barnwell	*	*
Bruderheim	*	
Plamondon	*	*
Rosedale	*	
Standoff	*	*
Youngstown	*	

TABLE IV

1970 WATER, SEWERAGE AND SEWAGE TREATMENT SUMMARY FOR ALBERTA

Population Group	Number of Communities	Served With Waterworks		Served With Sewerage		Served With Sewage	
		Number	%	Number	%	Number	%
Over 10,000	7	7	100	7	100	7	100
3,000 - 10,000	22	22	100	22	100	22	100
1,000 - 3,000	58	57	98	56	97	55	98
500 - 1000	42	40	95	40	95	40	100
300 - 500	52	47	90	49	94	49	100
150 - 300	65	54	83	55	85	55	100
Under 150	34	20	59	19	56	19	100
TOTAL	280*	247		248		247	
AVERAGE			88%		89%		99.6%

Note: Jasper; Banff; Waterton; Lloydminster; hamlets with neither water nor sewerage systems; institutions and summer villages are not included.

* - of these 280 communities, there are 267 with water and/or sewerage.

Fluoridation

Fluoridation of municipal water supplies and its operation is under the control of this section.

Monthly reports from the communities fluoridating their water supplies are forwarded for checking and to determine the fluoride residual based on the amount of chemicals added and water treated. When a report indicates a high reading, then the respective community is notified and requested to adjust their feed rate or make the necessary changes to their equipment or method of operation.

In addition to the monthly reports, a yearly summary is prepared for each town and the respective fluoridation program reviewed.

The population served by controlled fluoridation is now 571,614 which represents 47.9% of the population served by piped water systems and 36.3% of the population of Alberta. An additional 35,499 people are using water with a natural fluoride content between 0.9 ppm and 1.5 ppm, making a total of 51% of the urban Alberta population being served with water containing 0.9 ppm to 1.5 ppm fluoride.

Communities which commenced fluoridation during 1970, include Taber and Cold Lake (C.F.B.). There are now 37 communities with fluoride adjusted water supplies.

Swimming Pools

The Municipal Engineering Section is responsible for the approval and initial inspection of public and semi-public swimming pools. A total of 2 public and 20 semi-public pools were recommended and approved for construction during 1970.

During 1970, 29 inspections of public and semi-public pools were conducted. The public pools were approved for the communities of Medicine Hat and Rimbey. Semi-public pools were approved for Calgary (8), Edmonton (10), Medicine Hat (1), and Edson (1).

Table V provides the statistics regarding swimming pools in Alberta.

Operator's Schools

The water and sewerage operator's schools were continued in 1970. A third year and graduate school were held with 101 and 90 operators respectively in attendance.

Table VI lists the attendance figures to date for these schools.

Arrangements have been made to conduct a first year operator's school in 1971.

Operator's manuals, containing the lecture material from each school were prepared and forwarded to each person in attendance.

Staff

The permanent staff consists of four engineers and one technologist. All positions were full during the year.

During the summer two university students were hired to aid in the sampling and review of sewage treatment plants. This has been a continuing program and has greatly assisted in the upgrading of sewage treatment plants in the province.

Calgary Office

As of May, 1968 one of the municipal engineers has been present in the Calgary office during Monday afternoon and Friday morning of the first full week of every month. During the balance of the week, normal inspections, etc. are conducted in the southern part of the province.

There have been 59 incoming calls, 88 outgoing calls and 12 visits made to the office and 10 meetings held in Calgary pertaining to the section's work during 1970.

The Calgary office has increased our service to the southern part of the province as it ensures at least one visit per month is made to this portion of the province. As a result of this, there is more work being completed in this area and more assistance being given to the communities and health units. Evidence of the presence of an engineer in the Calgary area is provided by the increased number of certificates from the area and upgrading of the sewage treatment plants.

Corrosion Control Program

A control program for checking the corrosiveness of chemically treated municipal water supplies was completed during 1970. Small metal "test coupons" were inserted in the waterworks system for 90 day intervals, after which the resulting weight changes are determined. These are correlated with the chemical constituents of the water

by use of the "Langelier's Saturation Index". If the water is excessively scale forming or corrosive the municipality is advised of the required corrective measures. Of the sixteen communities checked only five were maintaining the proper control and surveillance of the scaling and corrosive quality of the water prior to the testing program. The method and results of the control program were reported in a paper presented at the Western Canada Water and Sewage Conference in Winnipeg.

Sampling

Samples submitted to our laboratory from water supplies, sewerage systems and swimming pools are mainly those for control purposes and for use in answering specific questions or problems.

A breakdown of the samples listed are as follows:

Type of Sample	River, Tap, Well, Etc.	Sewage	Misc.	Total
No. of samples tested	207	219	57	583

Regulations - Certification of Operators

The Provincial Board of Health Regulations Respecting Water Supplies (Division 10) were revised and updated; and the Regulations Respecting The Disposal of Waste Water and the Control of Water Pollution (Division 39) were established in January 1970.

Of particular importance was the requirement that the municipal system be effectively operated and maintained by a qualified operator and that the name of the operator be on record with the Provincial Board of Health.

All municipal systems have been classified and the majority of operators certified in accordance with the guidelines established by the Western Canada Water and Sewage Conference. The certification of operators was based on a voluntary system.

Special Surveys

Two special surveys were conducted by the section during 1970. These surveys were part of a preliminary study to determine the need and feasibility of providing waterworks and sewerage systems in the Hamlets of Rosedale and Midlandvale.

House to house interviews were conducted to assess the adequacy of the existing private water and sewage disposal

facilities and to establish priorities on what were required. Samples of the well waters were obtained for both chemical and bacteriological analyses. The hamlets were topographically surveyed to determine possible sewer profiles, water sources, etc.

From the results of the surveys an engineering report was prepared providing factual information regarding the provision of water and sewerage systems. Estimated costs of the proposals were included in the report.

The report resulted in the installation of a waterworks system in Rosedale. The report for the Hamlet of Midlandvale is under consideration.

Western Canada Water and Sewage Conference Correspondence Course for Water Treatment Plant Operators in Alberta

This course is a correspondence course for operators of water treatment plants and is provided through the Western Canada Water and Sewage Conference. The section supervises the 13 separate lessons and provides assistance to the operators when required. Eleven applications have been received for the 1970-71 course.

Table VII gives a summary of the attendance of this course for Alberta operators.

Conferences

The Western Canada Water and Sewage Conference (in Winnipeg) was attended by three engineers. This is an important conference to our division as the technical program deals directly with our work and provides an opportunity to meet with those public health and consulting engineers, contractors, operators and suppliers from the prairie provinces with which we work throughout the year.

The Canadian Section of the Canadian Institute on Pollution Control (in Calgary) was attended by two engineers. These conferences are technical conferences, however, they also provide a means of furnishing the Alberta viewpoint and permit discussion with other informed people in our field.

Publications

The following publications were distributed or prepared during 1970.

1. Alberta Waterworks, Sewerage and Swimming Pools Survey 1969

2. Swimming Pool Operator's Manual

3. Graduate Operator's Manual

4. Third Year Operator's Manual

TABLE V

SWIMMING POOL STATISTICS TO DECEMBER 31, 1970

CATEGORY		NUMBER
Public Pools		99
Semi-Public Pools		159
Apartments	67	
Motels and Hotels	51	
Clubs	26	
Camps	9	
Institutions	6	
National Park Pools		12
Department of National Defence Pools		8
TOTAL		278

TABLE VI

OPERATOR'S SCHOOLS

Completed first year course	526
Completed second year course	423
Completed third year course	380
Completed graduate school	241
Number of communities represented	195

TABLE VII

W.C.W.S.C. CORRESPONDENCE COURSE FOR WATER TREATMENT PLANT OPERATORS IN ALBERTA

	1962-1969	1970	Total
Number commencing course	99	28	127
Number completing course	49	22	71
Number passing course	42	*	*
Number of communities represented	64	-	-

* The twenty-two men who completed the course in 1970 will be writing their exams during January, 1971.

In addition to the above, four volumes of a bulletin entitled The Utility Operator were prepared and circulated to all operators of water and sewage systems, consulting engineers and health units. The Utility Operator is a quarterly publication, however, it is hoped that it will become a monthly edition. It's object to help keep the operator informed and to create added interest in the field. The circulation of this publication is now 767 and has gained wide acceptance.

Health Units

Medical officers of health and/or public health inspectors are contacted during our inspection trips throughout the province. Problems relating to the water and/or sewerage systems, solid waste disposal and swimming pools are often drawn to their attention and on which we can generally be of assistance.

Questions of an engineering nature, or those concerning the Division of Environmental Health are often raised by the health unit and on which our advice is requested. The cordial co-operation with the health unit is essential to our work and greatly appreciated.

Laboratory

W. E. Kortsch, M.Sc., Head

Analytical activities continued in co-ordination with the programs of the sections Air Pollution Control, Water Pollution Control and Municipal Engineering. Additionally, water samples from other agencies and departments such as Lands and Forests, and Agriculture, were processed, all in conjunction with pollution.

Again the accomplished work was extended considerably in quantitative and qualitative respects as this is the general trend from year to year. To a certain degree statistics reflect the quantity of performed work. In total, 7,165 samples were received and 34,302 tests performed on them which represents an 18 percent sample and 59 percent test increase over the year 1969, and a 307 percent sample and 780 percent test increase over the year 1960. These numbers reflect clearly the growing demands in controlling pollution.

The separation of the laboratory into two branches, the Chemistry I and the Chemistry II Branch, again proved to be very successful in 1970. The first branch engages a larger number of chemists and technicians in less complex analyses and more routine work, analyzing a large number of samples, whereas the second branch engages fewer staff members but deals with more complex and non-routine analyses, and with specialized functions in performing analytical research work, very often in connection with specific projects.

New Instrumentation

Of the additional equipment which was acquired, the instruments of a more complex nature were an atomic absorption spectrometer, a technicon auto analyzer and an automated titrator. They were delivered in the last weeks of the year and are in the stage of being tried at present, necessitating changes in analytical procedures. Also, the opportunity is given for an expansion of analytical programs.

As partially indicated by the names, it is the intention to use all three instruments to a high degree for automating analyses for several chemical elements and compounds in water, waste water and air. In addition, a high-vacuum device was designed and assembled as it will be outlined under section III.

Chemistry I Branch

This branch tested water, wastewater and air samples for approximately fifty constituents. Tables 1, 2 and 3 show the number of processed samples and tests divided into main sample types. The numbers indicate that the highest increase occurred in the fields of water pollution control and municipal engineering activities (37 and 44 percent growth, respectively, in samples 45 and 67 percent in tests over the previous year). Approximately 300 water and wastewater samples were processed for the Fish and Wildlife Division, Department of Lands and Forests, with reference to specific pollution cases.

Figures 1, 2 and 3 show the distribution of samples and tests from month to month throughout the year. A fairly high fluctuation can be noted in this respect indicating that the staff had to be prepared for peak periods in testing; however, it did happen that samples could not always be analyzed in due time during the summer months when heavy sampling activities coincided with staff vacation.

TABLE I

CHEMISTRY I BRANCH

WATER POLLUTION CONTROL	NUMBER OF SAMPLES	NUMBER OF TESTS
River and Lake Water	580	7,351
Industrial Waste Water	284	3,019
Sewage	143	1,669
Miscellaneous	56	756
From Other Departments & Agencies	467	2,645
Total	1,530	15,440
% Increase over 1969	37	45
Ratio: Tests to Samples	10.1	

TABLE II

CHEMISTRY I BRANCH

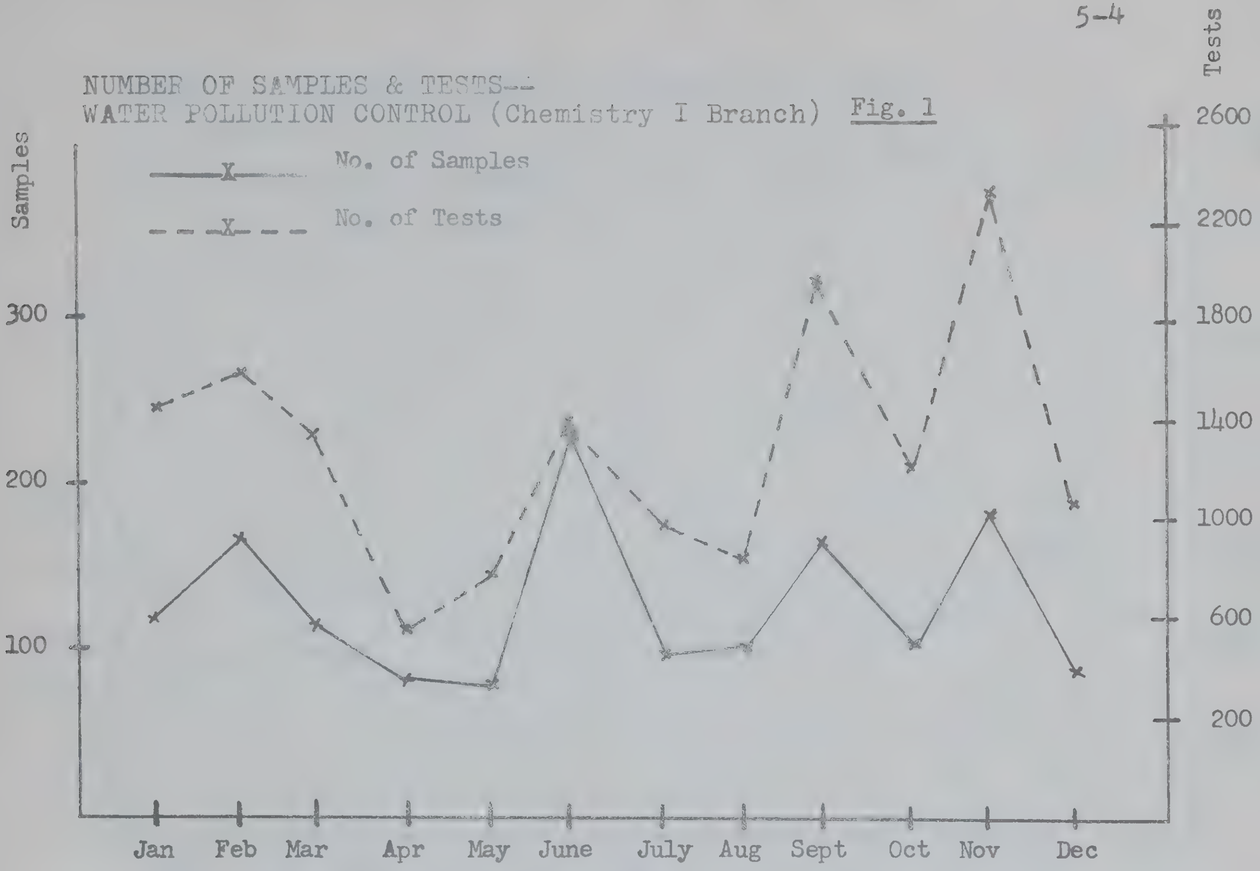
MUNICIPAL ENGINEERING	NUMBER OF SAMPLES	NUMBER OF TESTS
River, Well, Tap Water	207	2,774
Sewage	319	2,559
Miscellaneous	57	285
Total	583	5,618
% Increase over 1969	44	67
Ratio: Tests to Samples	9.6	

TABLE III

CHEMISTRY I BRANCH

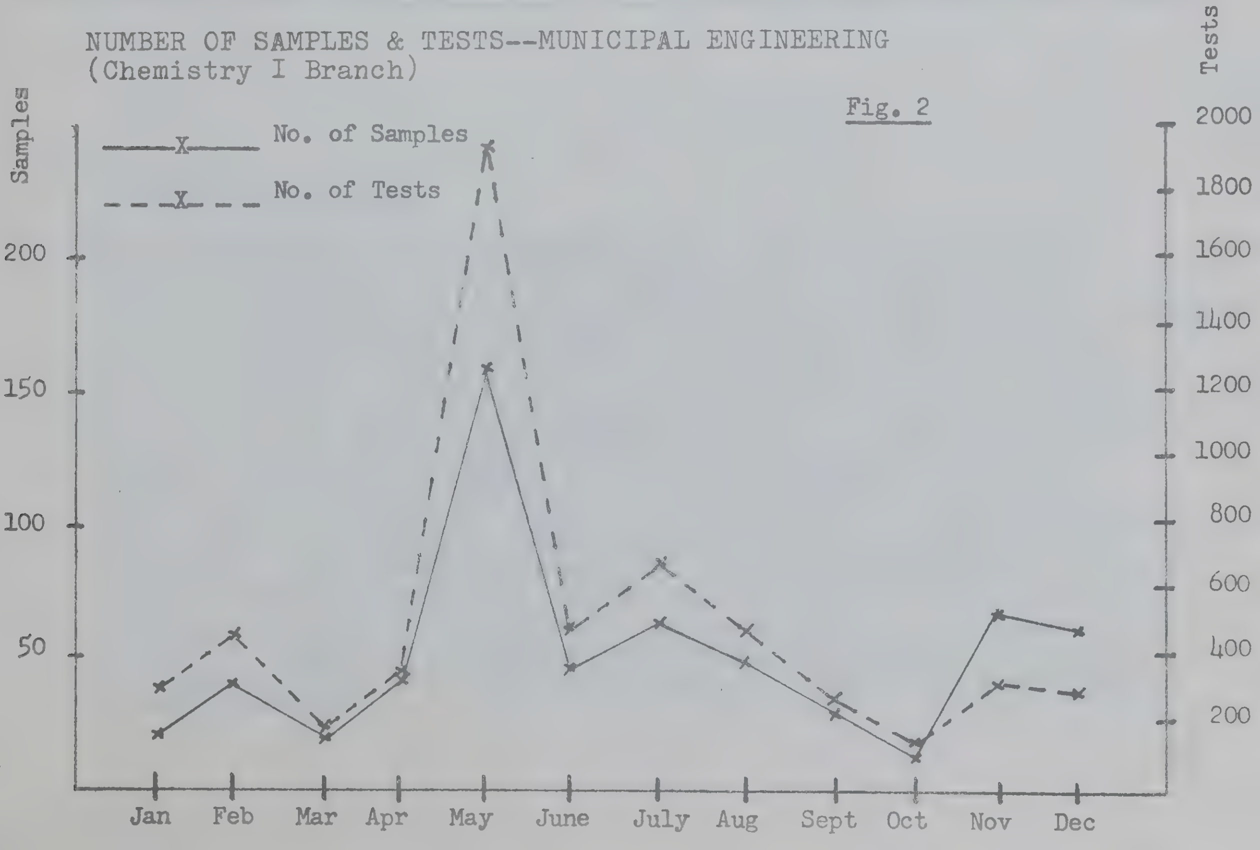
AIR POLLUTION CONTROL	NUMBER OF SAMPLES	NUMBER OF TESTS
Total Sulfation	1,805	1,805
Hydrogen Sulfide	1,741	1,741
Dustfall	669	1,417
Fluoride	87	87
Vegetation for Total Sulfur	171	171
Stack Samples	240	790
Total Suspended Particulate Matter	74	74
Total	4,787	6,085
% Increase over 1969	8	18
Ratio: Tests to Samples	1.3	

NUMBER OF SAMPLES & TESTS--
WATER POLLUTION CONTROL (Chemistry I Branch) Fig. 1



NUMBER OF SAMPLES & TESTS--MUNICIPAL ENGINEERING
(Chemistry I Branch)

Fig. 2



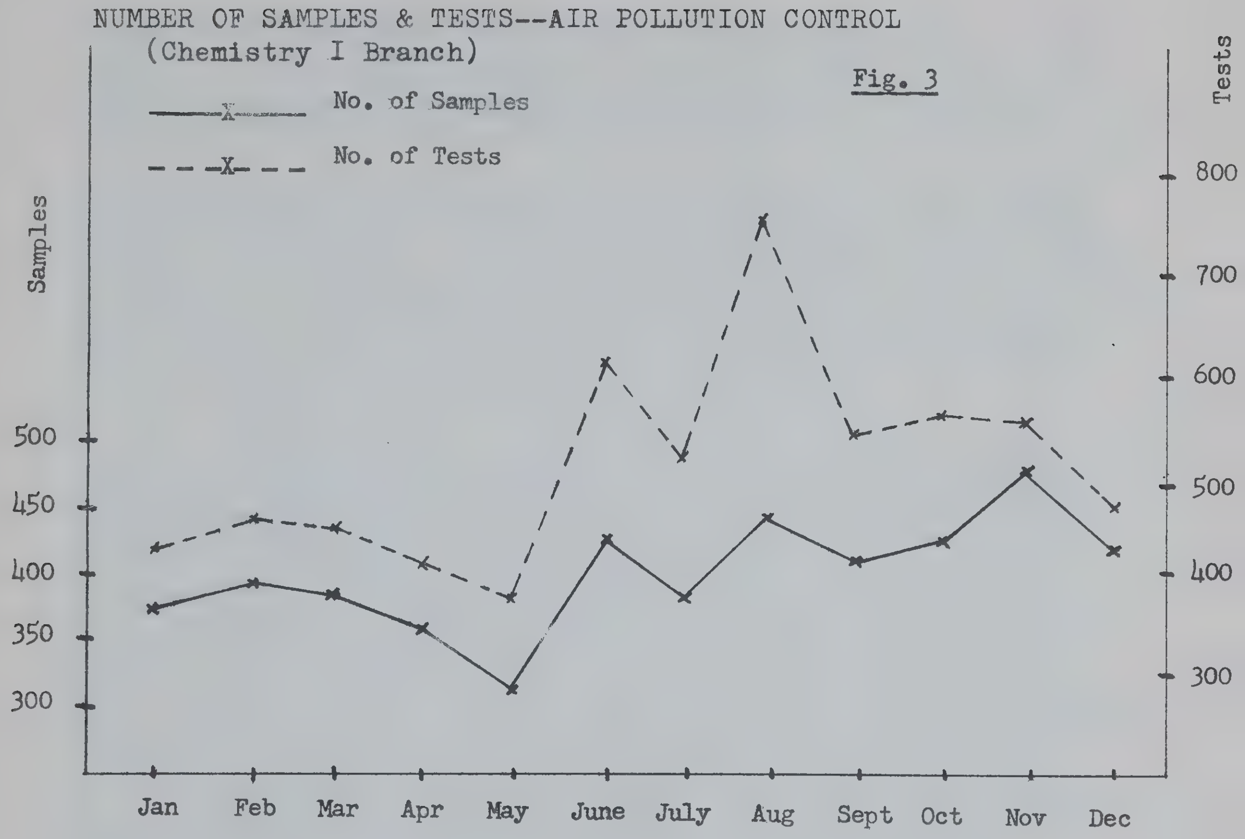

NUMBER OF SAMPLES & TESTS--AIR POLLUTION CONTROL
(Chemistry I Branch)

Fig. 3

CHEMISTRY II BRANCH

As in the previous year, analyses for pesticides and herbicides in water were performed, especially for those which degrade at a low rate such as a considerable number of chlorinated and some phosphorous hydrocarbons. Column and gas chromatographic separation and indentification techniques were applied. At present, the laboratory is in the position to test samples for a total of 35 of these compounds, and to determine chlorine concentrations of a fairly high number of presently non-identifiable compounds. Probably to a certain degree these are degrading herbicides and pesticides, possibly as deleterious as their parent compounds. Grab samples and carbon filters were processed, the latter representing constituents collected from several hundred gallons of water. In addition to the division's samples, analyses for pesticides and herbicides on approximately 110 water samples were performed for the Soils, Geology and Groundwater Branch of the Water Resources Division, Department of Agriculture.

In specific pollution cases caused by different types of hydrocarbons, such as gasoline, diesel oil and heavier oils, hydrocarbons were separated either into specific fractions or specific individual compounds, and the water was tested for some water soluble hydrocarbons being deleterious to fish life.

Significant successful efforts were made for the detection of low concentrations of air pollutants as well as for automobile exhaust constituents. In general, for analytical work of such nature gas chromatographic separation techniques were also to be applied. But mainly because of restriction in air/gas volume which can be injected into a gas chromatograph an all-glass-high-vacuum device was designed and assembled by the branch which is able to accomplish several functions.

At the sampling source, collection of polluted air or automobile exhaust is performed by either cooling the chemical compounds below their melting points and thus solidifying them, or by simply filling plastic bags at atmospheric pressure. In the first case the sample is introduced to the vacuum device by warming it up, in the second case directly without changing the temperature. Of major importance is that the sample is cooled below the melting points of all compounds immediately after it is introduced to the vacuum device. Concentration of the sample is achieved by evacuating the air from the system, then separation into groups of compounds is accomplished by warming the solid to form gas and leading the compounds to different types of gas chromatographic columns, each designated for a specific chemical group. Separation into individual compounds takes place in the columns, and identification of them by specific detectors.

Using the described separation and identification system, a research project was initiated to evaluate the efficiency of a catalytic exhaust muffler which is used for a number of Edmonton transit system buses. Exhausts under different engine loads are being tested for hydrocarbons, oxidized hydrocarbons such as aldehydes, ketones and acids, and for total nitrogen oxides, nitrous oxide, nitric oxide, nitrogen dioxide and carbon monoxide. Furthermore, the exhausts are filtered, and the resulting soot is being checked for total benzene extractable organic compounds and especially for the carcinogenic compound benzo(a)pyrene.

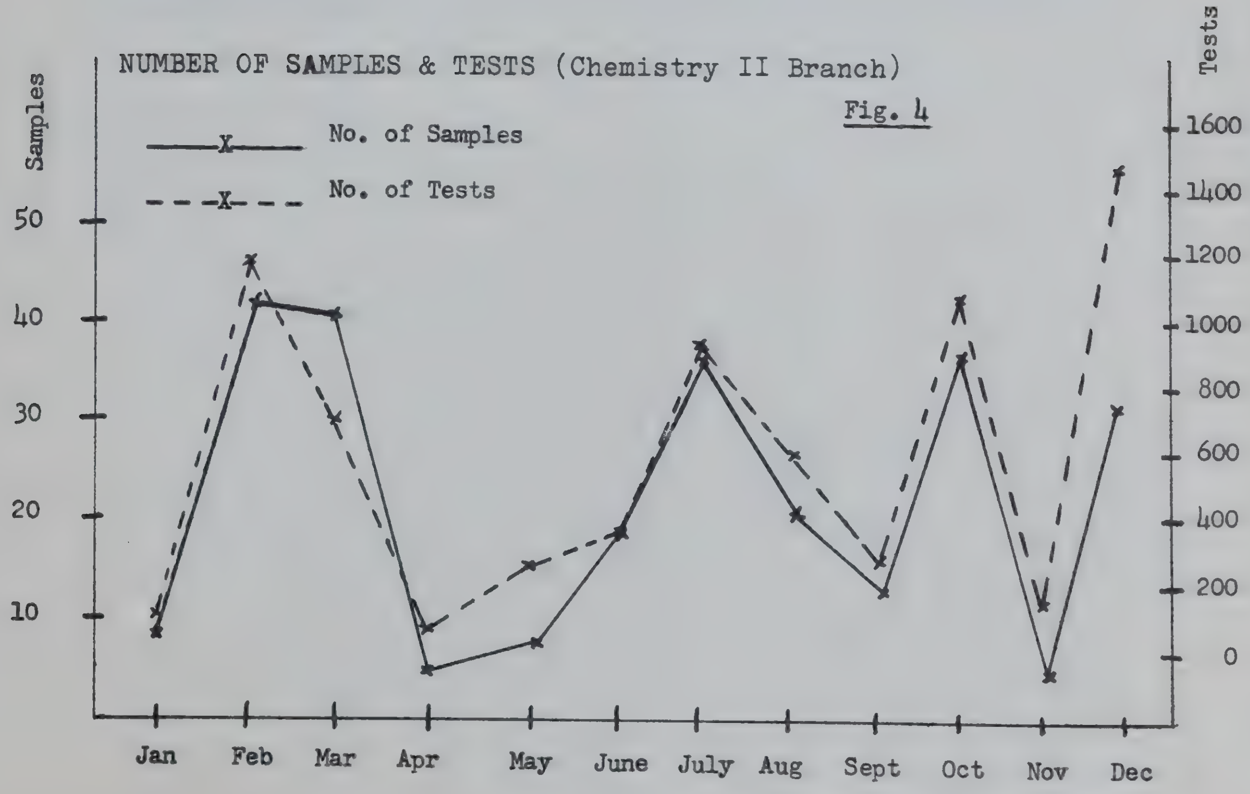
As experienced under the outlined conditions the vacuum/gas chromatograph system is able to detect pollutants such as aldehydes, ketones, acids and unoxidized hydrocarbons as low as 0.1 to 1 nanogram (1 nanogram = 1×10^{-9} gram). Therefore, with reference to air pollutants noticeable from time to time in the northeastern part of Edmonton the above findings could be of significant importance.

Table IV shows the total number of samples and tests performed by the Chemistry II Branch, and Figure 4 the montly distribution throughout the year.

TABLE IV

CHEMISTRY II BRANCH

TYPE OF SAMPLE	NUMBER OF SAMPLES		NUMBER OF TESTS
Water	162		4,596
Carbon Filters	7		210
Air Samples	31		766
Miscellaneous	65		1,587
Total	265		7,159
% Increase over 1969	135		306
Ratio: Tests to Samples		27.0	
Grand Total (Chemistry I and II Branches)	7,165		34,302
% Increase over 1969	18		59
% Increase over 1960	307		780



Federal Grant: "An Evaluation of Health Effects of Air Pollution in Alberta"

The above grant was established in 1969 for a period of three years and the survey is being conducted in co-operation between the University of Alberta and the Province of Alberta, Department of Health. A part of the study is the analyzing of suspended particulate matter which is collected at 13 stations throughout the province by high-volume samplers on glass fibre filters.

The laboratory is engaged in determining total suspended particulate matter, total cyclohexane extractable organic compounds as an indication of the presence of polycyclic hydrocarbons, and in analyzing for two specific polycyclics, i.e. benzo(a)pyrene and benzo(k)fluoranthene of which the first is of special interest due to its high degree of carcinogenity. Column chromatography and fluorescene spectroscopy are applied for their detection. During the year 1970 a total of 507 filters were processed.

For this work a chemist and laboratory technician are employed on a temporary basis.

Staff

The permanent staff consists of six laboratory scientists (chemists), eight laboratory technicians and one secretary.

Public Health Inspection

L.E. Stewart, Head

In 1970 there were positions for 76 full time public health inspectors in the Provincial Department of Health, city health departments and health units. At the end of the year there were two vacancies. Though these vacancies were of short duration there appears little prospect that either will be filled in the immediate future. During the year plans for training public health inspectors were considered. If these plans can be implemented in 1971 there should be some prospect of relieving recruitment problems over a period of time.

The Public Health Inspection Section of the Division of Environmental Health has positions for a chief public health inspector and three public health inspectors. A vacancy at the beginning of the year was filled in September when Mr. Robert Booth joined the staff. Unfortunately Mr. Booth resigned effective December 31, 1970 to accept a position in the City of Edmonton Health Department. A higher salary offer was a major inducement. This resignation is particularly regrettable coming as it did when Mr. Booth had just begun to reach his potential in the position.

Two candidates for the Certificate in Public Health Inspection (Canada) succeeded in the examination held in April. The Public Health Inspection Section assisted in setting up the examination.

There was no evidence of interest in complusory milk pasteurization bylaws in 1970. There are 42 such bylaws in effect in cities, towns and villages, there having been no change since 1965. The facts that pasteurized milk is generally available throughout the province and that only a small amount of unpasteurized milk is retailed are probably factors in this lack of interest.

Local boards of health suspended or refused nine restaurant permits during the year. Permits were issued or reinstated where necessary measures for the protection of public health were completed. Comparative figures for recent years are: 7 in 1969, 4 in 1968, 5 in 1967, 5 in 1966 and 3 in 1965. Though none of the suspensions or refusals of permits were appealed to the Provincial Board of Health, the Provincial

public health inspectors did give advice to medical officers and inspectors in certain health units in regard to standards which should be expected in restaurants.

The public health inspectors employed by the Division of Environmental Health were active throughout the year in activities related to environmental health. A total of 473 inspections were made. This figure does not include activities connected with the landfill survey and summer village environmental survey referred to later in this report.

There was considerable activity during the year designed to upgrade solid refuse disposal systems throughout the province. In view of the fact that new standards for sanitary landfills and modified landfills were to become effective January 1, 1971, a survey of progress towards compliance was carried out in June and July 1970. This survey, made by provincial public health inspectors, covered 100 representative towns and villages throughout the province. From this survey it was learned that:

necessary action completed	- 21
necessary action in progress	- 23
no action to date of investigation	- 56

Though the information was disappointing in terms of action to that time a good purpose was served. It stirred up interest in local health authorities and through them, in municipal authorities. As a result many municipalities did comply with the January 1, 1971 deadline for updating of facilities.

The provincial public health inspectors continued to be active in matters connected with the upgrading of solid refuse disposal facilities throughout the year. About 80 inspections outside of the survey were made at landfill sites to provide advice to local health authorities and municipal authorities.

The Regulations for the Control of Refuse Disposal Systems require that whenever a new modified landfill is to be established a permit must be obtained from the Provincial Board of Health. Eleven permits for establishment of modified landfills were granted in 1970 while approval of preliminary outline was granted in 13 instances. The Regulations also require that cities and towns having populations in excess of 5,000 must operate true sanitary landfills by January 1, 1971. It was also required that permits for these be obtained by January 1, 1971. Seven such permits were granted in 1970.

It is considered that the time spent by the Public Health Inspection Section on matter related to refuse disposal would be equal to full time for one inspector.

An environmental survey of summer villages on Lac Ste. Anne was carried out during the year in co-operation with the Stony Plain-Lac Ste. Anne Health Unit. This survey was concerned with provision and safety of private water supplies, sewage disposal arrangements and operation thereof, etc. The survey revealed no evidence to suggest that private sewage disposal systems were being operated in an improper manner. It was, however, found that one waste disposal ground was in deplorable condition resulting from its use for disposal of septic tank effluent. At the year end arrangements were progressing for replacing and updating this facility. There was indication of limited contamination of some water wells. It has been suggested that the health unit follow up on this to endeavor to determine the significance of this limited contamination. A general observation on the survey was that though premises throughout the six summer villages were frequently not modern in respect to conveniences, the quality of maintenance on individual properties was generally good.

As a follow up to the 1969 survey of the soft ice cream distribution industry a more limited project was carried out in 1970. The 1970 project determined reasonable bacterial standards for this product. It is anticipated that the information obtained will be the basis of standards for the industry for probable introduction in 1971. This will provide a framework to assist the industry to put its house in order.

Truck transportation of perishable foods was again a matter of concern in 1970. A survey made through the health units revealed that in many instances perishable commodities were transported on non-refrigerated trucks and that in some instances there was a lengthy period of time before delivery. It appears desirable that action be initiated in co-operation with other government departments and the industry to provide a safer means of transportation for perishable foods. At the year end endeavors were being made towards that end.

A number of requests were received from health units for assistance in dealing with problems connected with the establishment of feed lots, pig keeping operations, large poultry operations both egg laying and broiler, and similar activities. It has been found useful to make available the experience gained by provincial public health inspectors in this area.

A major portion of one inspector's time was spent in administering the Regulations Respecting Bedding and Upholstered and Stuffed Articles. Though the division endeavors to have local health authorities act as the primary contact, it has been found necessary to have a provincial public health inspector make many visits to ensure reasonably uniform compliance with the regulations. Between July 1, 1970, the

beginning of the licence year and December 31, 1970, 29 manufacturers and 102 renovators were registered with a registration revenue of $3,275.00. Comparative figures for the same period in 1969 were 31 manufacturers, 93 renovators and revenue $3,100.00.

In October there was a five-day In-service Training Course for public health inspectors from health units and city health departments. This course was held in the Sportex on the Edmonton Exhibition Grounds. The major portion of the planning and administering was handled by the Public Health Inspection Section. The course used panels and discussions to endeavor to assist inspectors to find reasonably uniform standards of compliance within the regulations. The course attracted an excellent attendance and strong participation. It was apparently one of the most successful within recent years.

A significant portion of one inspector's time was spent on cemeteries in an endeavor to clear up the matter of approvals of locations, proper registration of titles, etc. for many cemeteries which had been established without completion of formalities. A number were put in proper order by the year's end.

The Public Health Inspection Section was asked on several occasions to assist in health education activities by providing knowledgeable persons for addresses, panels, etc.

Provincial public health inspectors continued to be active participants on various boards and committees having responsibility in the health field.

The foregoing is a brief summary of some of the more significant activities in which the Public Health Inspection Section was engaged in 1970. Some other activities included inspections of trailer coach parks, milk producer's premises, restaurants, other food handling premises, private sewage disposal systems and public and private water supplies.

The provincial public health inspectors were engaged throughout the year in activities designed to protect the health and comfort of the people of Alberta.

Plumbing Inspection

W.A. Milligan, Head

The number of inspections made, the number of plumbing permits issued and the amount of revenue received during 1970 was slightly below the previous year but above that of 1968 and all previous years.

The income received totalled $23,608.50. The number of plumbing permits issued totalled 1,845 and the number of private sewage disposal system permits issued was 181. The number of plumbing fixtures installed throughout the province was 369,910. The value of the plumbing installed is estimated to be approximately 78 million dollars.

The number of individual types of fixtures installed was as follows:

Water Closets	90,531	Lavatory Basins	91,257
Baths	67,506	Sinks	71,394
Laundry Facilities	5,244	Special Fixtures	43,978

During 1970 this section received requests from eight urban municipalities to take over the responsibility of providing plumbing inspection for them. We are now providing this service for 169 urban municipalities in the province. In order that a uniform inspection may be provided, it is our opinion that we should provide this inspection service for all urban municipalities, other than cities.

The inspectors of this section were required to spend much more time in factories producing mobile homes, relocatable buildings, bunk houses, etc. than in previous years. Buildings and dwellings of the relocatable type are in demand more and more with each passing year.

During 1970 inspectors from this section, assisted by technicians from our Water Pollution Control Section, completed a survey of Sylvan Lake, and the properties located in seventeen subdivisions surrounding the lake, to determine if plumbing system installations were causing any pollution of the lake. The survey concluded that plumbing system installations

were not casuing any form of lake pollution whatsoever. This survey was very well received by the public involved and everyone was as co-operative as possible with the survey team. It is our intention to carry out further surveys of this type at other lakes within the province during the coming year.

The Provincial Plumbing and Drainage Regulations were amended in many areas during the year. These amendments were made so our regulations will parallel those of the National Building Code and thereby forge another link in the chain of uniformity of plumbing regulations across Canada.

Each of our offices reported an increase in the number of individuals visiting the office for guidance and information to assist them with the installation of a plumbing system to serve their dwelling. The public certainly appreciate this service and consider it beneficial and most worthwhile.

It is expected that 1971 will be a very busy year for our section as all indications point to an increase in construction spending.

GOVERNMENT [illegible] ALBERTA
MAY 07 1971
Edmonton, Alberta